

IN THE CLAIMS

What is claimed is:

1 1. A system for communicating information between a first location within a vehicle and
2 a second location within or very near to the vehicle, wherein the vehicle has a conductive
3 metallic structure defining one or more major compartments, the system comprising:

4 an exciter unit including a first communication equipment and an exciter
5 device that is conductively connected to the metallic structure of the vehicle;

6 a remote unit including a second communication equipment having a probe
7 that is not conductively connected to the metallic structure of the vehicle;

8 said first communication equipment suitable to accept the information at the
9 first location and modulate a signal with the information, wherein said signal has a
10 carrier frequency that is selected to be either below cut-off for evanescent
11 electromagnetic fields or above cut-off for propagating electromagnetic fields;

12 said exciter device suitable to receive said signal from said first
13 communication equipment and conductively inject said signal as a current into the
14 metallic structure of the vehicle such that an electromagnetic field is produced;

15 said second communication equipment suitable to couplingly receive said
16 electromagnetic field from the metallic structure of the vehicle via said probe,
17 demodulate the information from said electromagnetic field, and provide the
18 information at the second location;

19 said second communication equipment also suitable to accept the information
20 at the second location, to modulate said electromagnetic field with the information,
21 and to couplingly transmit said electromagnetic field into the metallic structure of the
22 vehicle via said probe such that said current is generated there in;

23 said exciter device also suitable to conductively extract said signal as said
24 current from the metallic structure of the vehicle and provide said signal to said first
25 communication equipment; and

26 said first communication equipment also suitable to demodulate the
27 information from said signal and provide the information at the first location, thereby
28 providing the ability to communicate the information between the first location and
29 the second location in a wireless manner.

1 2. The system of claim 1, wherein said exciter device includes:

2 a cone-surface simulate formed of an arranged plurality of conductive wires;

3 a cone-base formed of a first conductive plate conductively connected to the metallic
4 structure of the vehicle;
5 a conductive spiral resonator having a centrally located resonator-base formed of a
6 second conductive plate, wherein said resonator-base is centrally and
7 conductively connected to the vertex of said cone-surface; and
8 a conductor suitable for delivering said current to the vertex of said cone-surface.

1 3. The system of claim 2, wherein:
2 said plurality of conductive wires includes four said conductive wires;
3 said first conductive plate and said second conductive plate are flat discs ranging from
4 three to four inches in diameter;
5 said spiral resonator is planar and nominally twelve inches in diameter; and
6 said exciter unit ranges from two to three inches in height.

1 4. The system of claim 1, wherein said exciter device includes:
2 a matching network for efficiently allowing a desired alternating component of said
3 current to pass to the metallic structure of the vehicle; and
4 a blocking capacitance for preventing any direct component of said current from
5 passing to the metallic structure of the vehicle.

1 5. The system of claim 4, wherein said matching network includes a series connected
2 inductance and a shunt connected shunt capacitance.

1 6. The system of claim 1, wherein the vehicle includes a plurality of the second locations
2 and a like plurality of said remote units, thereby forming a network having the ability to
3 communicate the information between said first location and any of said plurality of the
4 second locations.

1 7. A system for communicating a information from a first location within a vehicle to a
2 second location within or very near to the vehicle, wherein the vehicle has a conductive
3 metallic structure defining one or more major compartments, the system comprising:
4 an exciter unit including a first communication equipment and an exciter
5 device that is conductively connected to the metallic structure of the vehicle;

6 a remote unit including a second communication equipment having a probe
7 that is not conductively connected to the metallic structure of the vehicle;

8 said first communication equipment suitable to accept the information at the
9 first location and modulate a signal with the information, wherein said signal has a
10 carrier frequency that is selected to be either below cut-off for evanescent
11 electromagnetic fields or above cut-off for propagating electromagnetic fields;

12 said exciter device suitable to receive said signal from said first
13 communication equipment and conductively inject said signal as a current into the
14 metallic structure of the vehicle such that an electromagnetic field is produced; and

15 said second communication equipment suitable to couplingly receive said
16 electromagnetic field from the metallic structure of the vehicle via said probe,
17 demodulate the information from said electromagnetic field, and provide the
18 information at the second location, thereby providing the ability to communicate the
19 information from said first location to said second location in a wireless manner.

1 8. A system for communicating information from a first location within or very near to a
2 vehicle to a second location within the vehicle, wherein the vehicle has a conductive metallic
3 structure defining one or more major compartments, the system comprising:

4 a remote unit including a first communication equipment having a probe that
5 is not conductively connected to the metallic structure of the vehicle;

6 an exciter unit including a second communication equipment and an exciter
7 device that is conductively connected to the metallic structure of the vehicle;

8 said first communication equipment suitable to accept the information at the
9 first location, to modulate an electromagnetic field with the information, and to
10 couplingly transmit said electromagnetic field into the metallic structure of the vehicle
11 via said probe such that a current is generated there in, wherein said electromagnetic
12 field has a carrier frequency that is selected to be either below cut-off for evanescent
13 electromagnetic fields or above cut-off for propagating electromagnetic fields;

14 said exciter device suitable to conductively extract said current from the
15 metallic structure of the vehicle and obtain a signal from said current; and

16 said second communication equipment suitable to receive said signal from
17 said exciter device, demodulate the information from said signal, and provide the
18 information at the second location, thereby providing the ability to communicate the
19 information from said first location to said second location in a wireless manner.

1 9. A system for communicating information between at least two locations within a
2 vehicle, wherein the vehicle has a conductive metallic structure defining one or more major
3 compartments, the system comprising:

4 a plurality of exciter units equaling the number of the locations and each
5 including a communication equipment and an exciter device that is conductively
6 connected to the metallic structure of the vehicle;

7 said communication equipment each suitable to accept the information at its
8 respective location and modulate a signal with the information, wherein said signal
9 alternates at a radio frequency;

10 said exciter devices each suitable to receive said signal from its respective said
11 communication equipment and conductively inject said signal as a current into the
12 metallic structure of the vehicle;

13 said exciter devices each also suitable to conductively extract said current
14 from the metallic structure of the vehicle, obtain said signal from said current, and
15 provide said signal to its respective said communication equipment; and

16 said communication equipment each also suitable to demodulate the
17 information from said signal and provide the information at its respective location,
18 thereby providing the ability to communicate the information between said locations
19 in a wired equivalent manner.

1 10. The system of claim 9, wherein said exciter devices include:

2 a cone-surface simulate formed of an arranged plurality of conductive wires;

3 a cone-base formed of a first conductive plate conductively connected to the metallic
4 structure of the vehicle;

5 a conductive spiral resonator having a centrally located resonator-base formed of a
6 second conductive plate, wherein said resonator-base is centrally and

7 conductively connected to the vertex of said cone-surface; and

8 a conductor suitable for delivering said current to the vertex of said cone-surface.

1 11. The system of claim 10, wherein:

2 said plurality of conductive wires includes four said conductive wires;

3 said first conductive plate and said second conductive plate are flat discs ranging from
4 three to four inches in diameter;

5 said spiral resonator is planar and nominally twelve inches in diameter; and
6 said exciter unit ranges from two to three inches in height.

1 12. The system of claim 9, wherein said exciter devices include:
2 a matching network for efficiently allowing a desired alternating component of said
3 current to pass to the metallic structure of the vehicle; and
4 a blocking capacitance for preventing any direct component of said current from
5 passing to the metallic structure of the vehicle.

1 13. The system of claim 12, wherein said matching network includes a series connected
2 inductance and a shunt connected shunt capacitance.

1 14. The system of claim 9, wherein the vehicle includes a plurality of the locations
2 exceeding two in number and a like plurality of said exciter units, thereby forming a network
3 having the ability to communicate the information between said plurality of the locations.

1 15. A system for communicating a information from a first location to a second location
2 within a vehicle, wherein the vehicle has a conductive metallic structure defining one or more
3 major compartments, the system comprising:

4 a first exciter unit at the first location and including a first communication
5 equipment and a first exciter device that is conductively connected to the metallic
6 structure of the vehicle;

7 a second exciter unit at the second location and including a second
8 communication equipment and a second exciter device that is conductively connected
9 to the metallic structure of the vehicle;

10 said first communication equipment suitable to accept the information and
11 modulate a signal with the information, wherein said signal alternates at a radio
12 frequency;

13 said first exciter device suitable to receive said signal from said first
14 communication equipment and inject said signal as a current into the metallic
15 structure of the vehicle;

16 said second exciter device suitable to extract said current from the metallic
17 structure of the vehicle and obtain said signal from said current; and

18 said second said communication equipment suitable to receive said signal
19 from said second exciter device, demodulate the information from said signal, and
20 provide the information at the second location, thereby providing the ability to
21 communicate the information between said first location and said second location in a
22 wired equivalent manner.

1 16. A method for communicating information from a first location within a vehicle to a
2 second location within or very near to the vehicle, wherein the vehicle has a conductive
3 metallic structure defining one or more major compartments, the method comprising the steps
4 of:

- 5 (a) accepting the information at the first location;
- 6 (b) modulating a signal with the information, wherein said signal has a carrier
7 frequency that is selected to be either below cut-off for evanescent electromagnetic
8 fields or above cut-off for propagating electromagnetic fields;
- 9 (c) conductively injecting said signal as a current into the metallic structure of the
10 vehicle such that an electromagnetic field is produced;
- 11 (d) couplingly receiving said electromagnetic field from the metallic structure of the
12 vehicle;
- 13 (e) demodulating the information from said electromagnetic field; and
- 14 (f) providing the information at the second location, thereby providing the ability to
15 communicate the information from said first location to said second location in a
16 wireless manner.

1 17. The method of claim 16, wherein a plurality of the second locations are present, and
2 wherein said step (f) includes providing the information to a designated one of said plurality
3 of the second locations, thereby providing the ability to communicate the information within
4 a network of the first location and said plurality of the second locations.

1 18. A method for communicating information from a first location within a vehicle to a
2 second location within or very near to the vehicle, wherein the vehicle has a conductive
3 metallic structure defining one or more major compartments, the method comprising the steps
4 of:

- 5 (a) accepting the information at the first location;

(b) modulating an electromagnetic field with the information, wherein said electromagnetic field has a carrier frequency that is selected to be either below cut-off for evanescent electromagnetic fields or above cut-off for propagating electromagnetic fields;

(c) couplingly transmitting said electromagnetic field to the metallic structure of the vehicle such that a current is produced therein;

(d) conductively extracting said current from the metallic structure of the vehicle and obtain a signal from said current;

(e) demodulating the information from said signal; and

(f) providing the information at the second location, thereby providing the ability to communicate the information from said first location to said second location in a wireless manner.

19. A method for communicating information from a first location to a second location within a vehicle, wherein the vehicle has a conductive metallic structure defining one or more major compartments, the method comprising the steps of:

(a) accepting the information at the first location;

(b) modulating a signal with the information, wherein said signal has a carrier frequency that is selected to be either below cut-off for evanescent electromagnetic fields or above cut-off for propagating electromagnetic fields;

(c) conductively injecting said signal as a current into the metallic structure of the vehicle;

(d) conductively extracting said current from the metallic structure of the vehicle and obtaining said signal from said current;

(e) demodulating the information from said signal; and

(f) providing the information at the second location, thereby providing the ability to communicate the information from said first location to said second location in a wired equivalent manner.

20. The method of claim 19, wherein a plurality of the second locations are present, and wherein said step (f) includes providing the information to a designated one of said plurality of the second locations, thereby providing the ability to communicate the information within a network of the first location and said plurality of the second locations.